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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/634,141	08/04/2003	Ilya V. Karpov	ITO.0554US (P16589)	5089
21906	7590	08/24/2004	EXAMINER	
TROP PRUNER & HU, PC 8554 KATY FREEWAY SUITE 100 HOUSTON, TX 77024			LEE, EUGENE	
			ART UNIT	PAPER NUMBER
			2815	

DATE MAILED: 08/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/634,141

**Applicant(s)**

KARPOV, ILYA V.

**Examiner**

Eugene Lee

**Art Unit**

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 04 August 2003.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-31 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 11/3/03.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, and 11 thru 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Chiang 6,545,287 B2. Chiang discloses (see, for example, FIG. 7) a phase-change memory cell comprising a phase change material 18, heater 22, pore 31, and insulating layer (insulator) 14. An upper portion (first portion) of material 14 extends over insulating layer 14 and a lower portion (second portion) extends into the pore.

Regarding claim 14, see, for example, FIG. 7 wherein Chiang discloses a spacer 24.

Regarding claim 16, see, for example, column 3, lines 53-55 wherein Chiang discloses the heater 22 being made of titanium nitride (metallic).

Regarding claim 17, see, for example, FIG. 7 wherein Chiang discloses an upper electrode 20.

Regarding claims 18 and 19, see column 2, lines 49-50 wherein Chiang discloses the phase material may be formed of a chalcogenide alloy, an ovonic material.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chiang '287 B2 as applied to claims 1, and 11-20 above, and further in view of Lee et al. 6,605,821 B1. Chiang does not disclose a substrate made of semiconductor. However, Lee discloses (see, for example, column 6, lines 34-39) a phase-change memory structure comprising a substrate made of silicon (semiconductor). The substrate supports the phase-change memory structure. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have a semiconductor substrate in order to support a phase-change memory in a semiconductor device.

5. Claims 3 thru 6, 9, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chiang '287 B2 in view of Lee et al. '821 B1 as applied to claim 2 above, and further in view of Harshfield 6,117,720. Chiang in view of Lee does not disclose completely filling said pore with a metal to form a heater, planarizing the upper surface of said insulator, and removing an upper portion of said metal in said pore. However, Harshfield discloses (see, for example, FIG. 4) a memory cell comprising a plug (metal) 61 completely filling a dielectric volume (insulator) 50. In column 4, lines 28-33, Harshfield further discloses that any excess material above the top surface 56 is removed by mechanical or chemical-mechanical planarization. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to completely fill

said pore with a metal to form a heater and to planarize the upper surface of said insulator in order to subsequently form a phase change material in the pore and to remove any excess material.

Chiang in view of Lee does not disclose removing an upper portion of said metal in said pore. However, Harshfield discloses (see, for example, FIG. 4 and 5) a memory cell comprising the steps of removing a plug 61 below at top surface 56. In column 4, lines 36-44, Harshfield discloses the plug is recessed below the top surface to form the base portion 42 and leave free the upper cavity portion 54. It would have been obvious to one of ordinary skill in the art at the time of invention to remove an upper portion of said metal in said pore in order to form a free cavity wherein a phase change material may be deposited.

6. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chiang '287 B2 in view of Lee '821 B1 in view of Harshfield '720 as applied to claims 3-6, 9, and 10 above, and further in view of Hudgens et al. 6,507,061 B1. Chiang in view of Lee in view of Harshfield does not disclose patterning and etching said phase change material over said insulator. However, Hudgens discloses (see, for example, FIG. 1) a phase-change memory comprising a phase change material 22. In column 3, lines 25-27, Hudgens discloses the patterning and etching of the phase change material to form the phase-change memory. It would have been obvious to one of ordinary skill in the art at the time of invention to pattern and etch said phase change material over said insulator in order to remove any excess material in the phase change memory.

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7. Claims 21, and 23 thru 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chiang '287 B2 as applied to claims 1, and 11-20 above, and further in view of Dennison 6,744,088 B1. Chiang does not disclose a processor-based device, and a wireless interface coupled to said processor-based device. However, Dennison discloses (see, for example, FIG. 13) a system comprising a controller (processor-based device) 510 and a wireless interface 540. In column 8, lines 62-column 9, lines 7, Dennison discloses the system may be used in wireless devices such as a personal digital assistant, laptop, portable computer, wireless telephone, etc. It would have been obvious to one of ordinary skill in the art at the time of invention to have a processor-based device, and a wireless interface coupled to said processor-based device in order to form a system that functions as a wireless device such as a personal digital assistant, a laptop, portable computer, telephone, etc.

8. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chiang '287 B2 in view of Dennison '088 B1 as applied to claims 21, and 23-31 above, and further in view of Rostoker et al. 6,373,447 B1. Chiang in view of Dennison does not disclose the wireless interface including a dipole antenna. However, Rostoker discloses (see, for example, column 1, lines 10-26) wireless networks wherein antennas are needed to receive and send signals. In the abstract, Rostoker discloses a dipole antenna as one of many antenna types that may be used in a system such as a computer. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to have the wireless interface including a dipole antenna in order to receive and send signals in a wireless network or for use in a computer.

### INFORMATION ON HOW TO CONTACT THE USPTO

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eugene Lee whose telephone number is 571-272-1733. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 571-272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Eugene Lee  
August 14, 2004

A handwritten signature in black ink, appearing to be 'E. Lee', with a stylized, cursive script.